BETTER UTILISATION OF OFFALS FROM BUFFALO HIDES

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Shoulder and belly pieces from Indian buffalo hides were tanned and finished into different types of leathers with a view to study the better utilisation of the offals. Bunwar and kattai leathers were found to have greater market potentiality than other types of leathers produced. Buffalo hide offals could also be conveniently finished into shrunken grain or corrected grain upper leather but their market potentiality depends on the demand for such shoe upper leathers.

Ox butts or heavy buffalo hide butts are mostly used in India for making industrial leathers; imported buffalo and steer hides are also used for certain types of industrial leathers. The offals e.g., shoulder and belly pieces of these hides, however, cannot be used for the purpose and tanners sometimes find it difficult to process the offals gainfully. Medium heavy buffalo hides are generally used in India for the manufacture of vegetable tanned sole leathers but no good quality sole can be made from the belly portions of the hide. In U.S. and European countries, the marketing of steer hides in the form of crupons, shoulders and bellies has become an established practice. But in India hides are marketed only in full pieces. Cattle hides in India belong mostly to low and medium weight ranges and produce offals of rather smaller areas; hence such offals are of little practical importance. The present work was undertaken to explore the possibilities of utilising the buffalo hide offals for various types of leathers.

Materials and methods

Slaughtered and fallen buffalo hides (average weight 54 lb.) were collected. Shoulders and belly pieces of the salted hides were cut and weighed [20·8% (256·8 kg.) and 33·7% (411·8 kg.) respectively of the salted weight]. Butts were used for making vegetable tanned sole leather. Shoulder and belly pieces were used in the manufacture of (i) chrome lace leather, (ii) hydraulic leather, (iii) upper leather, (iv) shrunken grain leather, (v) bunwar and kattai leathers and (vi) sole leather.

Chrome lace leather for woven upper

Only the belly pieces were taken for the production of chrome lace leathers. Salted pieces were soaked overnight and then limed in a pit containing 1% sodium sulphide, 7% lime, 150% old lime liquor and 150% water. After 3 days, the pieces were unhaired and put into a fresh lime liquor containing 7% lime and 300%

water. Next day, they were fleshed, scudded, washed and delimed. The pelts were pickled and chrome tanned in the usual way. The leathers were then shaved to a uniform thickness. After neutralisation they were dyed, mordanted with 3·5% cutch extract, fatliquored with 3% anionic fatliquor and dried. The leathers were staked, buffed, finished using conventional protein-based compositions and glazed.

Hydraulic leather

Shoulder pieces were processed up to pickling in the same way as for lace leather and then chrome tanned with 6% chrome extract (1·5% Cr_2O_3). The leathers were sammed, levelled, neutralised uniformly to a pH of about 4·5 and fatliquored with 3% anionic fatliquor. They were then vegetable tanned with 30% extract (on shaved weight) comprising 22·5% sulphited quebracho and 7·5% wattle. The leathers were further fatliquored with 4% anionic fatliquor and topped with about 1% cationic fatliquor. They were then set out, dried and finished after buffing and snuffing.

Upper leather

Belly and shoulder pieces were soaked overnight and limed for one day using 3·5% sodium sulphide, 2% caustic soda and a 300% float. After unhairing and fleshing the pelts were delimed partially, pickled and chrome tanned in the usual way, split and shaved. They were neutralised, fatliquored with 4% anionic fatliquor, retanned with 3% syntan (Basyntan FC) and 7% wattle extract and refatliquored with 2% anionic fatliquor. They were then set out, dried, staked, buffed and snuffed. The leathers were then resin-finished.

Shrunken grain leather

Shoulder and belly pieces were soaked overnight and limed as in the case of lace leather except in that the second liming was extended by two more days. The hides were then spilt, delimed completely and bated. The bated pelts were sammed and pretanned in a drum with crushed myrobalan nuts and *Peltophorum ferrugineum* leaves followed by myrobalan extract powder. Finally the pH of the bath was reduced using formic acid. The above operation took about 5 hours. The leathers were then retanned with chrome extract (8%), shaved, neutralised, fatliquored with anionic fatliquor (3%) and oiled. They were then dried and dry-drummed, boarded by hand to render the grain more prominent and then finished using acrylic binders.

Bunwar and kattai leathers

Shoulder and belly pieces were used in making bunwar and kattai leathers respectively. The pieces were soaked overnight, limed in the same way as for shrunken grain leather and delimed completely. They were vegetable-tanned using a blend of wattle and myrobalan extracts. After two days, the initial strength of liquor (10°Bk) was increased to 15°Bk. Every alternate day the strength was increased by 5°Bk upto a concentration of 25°Bk and then by 10°Bk till it reached 45°Bk. The strength was then raised to 60°Bk and tanning completed in the same liquor. The leathers were shaved to uniform thickness, bleached and fatliquored with

4% anionic fatliquor. They were well set. Kattai leathers were dubbined on the flesh side with 1% mixture of tallow and fish oil. Both kattai and bunwar leathers were dried, buffed, snuffed, finished with protein-based composition and glazed.

Sole leather

Only the belly pieces were taken for sole leather tannage. After an overnight soak, they were limed as for lace leather except in that the second liming was extended by one day. The pelts were delimed partially and tanned in the same way as kattai leather. The leathers were bleached, loaded with 1% loading material, fatliquored, oiled lightly, well set and dried. They were seasoned and rolled lightly.

Results and discussion

The results are given in Table 1. Assessment of each individual piece of shoulder or belly in the raw or finished condition has not been attempted. The leathers assessed by visual inspection have been found to be of average quality. After finishing them into various types of leathers, their present market values in India have been ascertained and compared.

The value index for the different types of leathers has been calculated from the equation $\frac{V_1 \times Y}{V_r}$ where V_1 is the market value of the leather per kg. or sq. ft., Y the yield of leather per kg. of raw hide and V_r the price of raw hides per kg.

Considering the price of raw hide offals as Re. 0·80 per kg. and from the values for V_1 and Y (Table 1), the value index of various leathers made from shoulder and belly pieces may be arranged in the following order:

Shoulder: Bunwar > hydraulic > upper > shrunken grain

Belly : Kattai > sole > upper > chrome lace > shrunken grain

It is apparent from Table 1 that bunwar leathers made from shoulder pieces and kattai leathers from belly pieces have the maximum market values; there is also a good demand for these types of leathers in India. These leathers are generally used in making chappal straps, insole for chappals, camera and transistor cases etc.

In case of heavier hides, however, the yields of bunwar and kattai leathers are expected to be less due to splitting up of the hides. To verify this aspect a separate lot of shoulder and belly pieces (210 kg.) from heavier hides (above 65 lb.) was finished into bunwar and kattai leathers. Total leather yield was 59 kg. and split 40 kg. The average market values for bunwar and kattai leathers and for unfinished splits were Rs. 10.00 and Rs. 3.00 per kg. respectively. The bigger size of the shoulders and more beadth of the belly pieces and comparatively less thickness of the leathers were responsible for the increased market value of these leathers. The value index for these leathers appears to be 3·71. Although the leather yield and value index are comparatively less in case of bunwar and kattai leathers from offals of heavy hides, the value index is high enough for practical consideration.

Table 1

VALUE INDEX OF DIFFERENT TYPES OF LEATHERS PRODUCED FROM BUFFALO HIDE OFFALS

Type of leather	Type of tannage	Offals taken	Weight of salted offals (kg.)	Leather yield (on raw wt.)	Total output calculated on total raw wt.	Approximate market value for the total quantity of leather	Value index $\frac{V_1 \times Y}{V_r}$
1. Lace leather	Chrome	Bellies	154·5	155 sq. ft.	413 sq. ft.	Rs. 413	1·2
2. Hydraulic leather	Chrome retan	Shoulders	91·0	27 kg.	76·2 kg.	Rs. 685	3·3
3. Upper leather	Chrome retan	Shoulders Bellies	143·0	A 77 sq. ft. B 78 „ C 74 „	A 360 sq. ft. B 365 „ C 345 „	Rs. 486 Rs. 493 Rs. 172 Rs. 1151	1·8
4. Shrunken grain leather	Semi-chrome	Shoulders Bellies	136·0	A 50 sq. ft. B 65 „ C 74 „	A 245 sq. ft B 319 „ C 345 „	Rs. 274 Rs. 357 Rs. 172 Rs. 803	1·7
5. Bunwar and kattai leathers	Vegetable	Shoulders Bellies	41·0 59·0	17 kf. 25 kf.	106·5 kg 174·5 kg.	Rs. 905 Rs. 1309 Rs. 2214	4·4 3·9
6. Sole leather	Vegetable	Bellies	113·5	63·5 kg.	230·4 kg.	Rs. 749	2·2

A. Shoulder B. Belly C. Split

Although hydraulic leather has got a moderately good market value, the demand for it is rather limited. It may be mentioned that sole leather could also be made out of the shoulder pieces and its market value is very close to that of hydraulic leather. In case of scarcity of vegetable tanning materials or in order to meet the demand for shoe upper leather, both the shoulder and belly pieces may be finished into upper leather and shrunken grain leather. Upper leather from these offals have a better market value in India than shrunken grain leathers probably due to the poor demand for shrunken grain leathers. The belly pieces of buffalo hides being rather narrow, are not very suitable for shrunken grain leather. But the shoulder pieces serve this purpose.

The market potential for shruknen grain leather is much less in India, but not so in other countries. If an export market for buffalo shrunken grain leather is found out, shoulder pieces from buffalo hides may be conveniently used. The proper use of splits would render the manufacture of upper and shrunken grain leathers more economical.

The production of industrial leathers was not attempted as the offals were not thick enough.

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